GEOMETRY.

When this issue was made up no solutions of 444, 446, 449 had been received. Please give attention to these.

451. Proposed by CLIFFORD N. MILLS, South Dakota State College.

Determine the sides of an isosceles triangle of given area, having given that the sum of its sides is equal to the sum of its base and altitude.

CALCULUS.

When this issue was made up no solutions of 348, 353, 354, 360, 363 had been received.

372. Proposed by V. M. SPUNAR, Chicago, Ill.

Find the condition that the equation:

$$\frac{d^2y}{dx^2} + \frac{1}{x}\frac{dy}{dx} - \left(1 + \frac{a^2}{x^2}\right) y = 0$$

should have one solution expressible in integral powers of x; and show that when this condition is satisfied, every other solution of the equation possesses a logarithmic infinity at the origin.

373. Proposed by C. N. SCHMALL, New York City, N. Y.

In the *Encyclopaedia Britannica* article on "Capillary Action" (Vol. 5, p. 268, 11th ed.) it is shown that $1/R_1 + 1/R_2 = p/T$, in the case of a soap bubble, where R_1, R_2 are the radii of curvature of a meridian section and a normal section, respectively, of the bubble; p, the difference of air-pressure; T, the energy per unit area of the film. Employing the principle that the soap bubble tends to assume a form such that the area of its surface is a *minimum* for a *given volume* of air, show by the Calculus of Variations that $1/R_1 + 1/R_2 = k$, where k is a constant.

MECHANICS.

Solutions of 286, 287, 288, 290, 291, 298, 299, 300 are desired.

300. Proposed by V. M. SPUNAR, Chicago, Ill.

A helical spring is composed of 20 turns of steel wire .258″ in diameter, the diameter of the coil being 3″. If the spring is compressed by a force of 50 lb., what is the maximum stress in the spring, its axial compression, and its resilience?

SOLUTIONS OF PROBLEMS.

ALGEBRA.

410. Proposed by C. N. SCHMALL, New York City.

Solve the simultaneous equations,

$$x^2 + xy + y^2 = a,$$
$$x^4 + x^2y^2 + y^4 = b.$$

SOLUTION BY HORACE OLSON, Chicago, Ill.

The equations may be written

$$x^2 + xy + y^2 = a, \tag{1}$$

$$(x^2 + xy + y^2)(x^2 - xy + y^2) = b. \tag{2}$$

Whence

$$x^2 - xy + y^2 = b/a. \tag{3}$$